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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/808,193	03/24/2004	Kenichi Koyanagi	NECN 21.087	4587
26304	7590	04/12/2005	EXAMINER	
KATTEN MUCHIN ZAVIS ROSENMAN			EVERHART, CARIDAD	
575 MADISON AVENUE			ART UNIT	
NEW YORK, NY 10022-2585			PAPER NUMBER	
			2891	

DATE MAILED: 04/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/808,193	<b>Applicant(s)</b> KOYANAGI ET AL.	
	<b>Examiner</b> Caridad M. Everhart	<b>Art Unit</b> 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3-24-04</u> . | 6) <input type="checkbox"/> Other: ____  |

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4,6,7,11-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Haukka, et al. (US 2002/0115252A1).

Haukka, et al disclose depositing a monoatomic film including a metal on a base by using a source gas and no oxygen(paragraph 0061 and 0069). Thereafter, a metal oxide film is deposited by CVD(paragraph 0097), as Haukka, et al teach that a CVD technique such as MOCVD can be used in the cited paragraph. Oxidizing gas may be supplied before the step of providing the monoatomic film, as Haukka, et al teach that the silicon substrate surface may be treated with water(paragraph 0045). The oxidizing gas may be oxygen or ozone(paragraph 0039). Oxidizing gas is provided to the surface of the monoatomic film(paragraph 0071). The step of forming a conductive film on the metal oxide film is also taught (paragraph 0008). The metal oxide film includes a layer of the aluminum oxide, which can be deposited by CVD(paragraph 0110). The CVD film can be tantalum oxide(paragraph 0056 and claim 20). The metal source includes the compound recited in claim 7(paragraph 0066). Hafnium and titanium compounds can be included (paragraph 0056). Niobium compounds can also be included (claim 20).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haukka, et al as applied to claim 1 above, and further in view of Dean, et al(US 2005/0009335A1).

Haukka, et al is silent with respect to treatment of the substrate with HF, although Haukka, et al does disclose an H-terminated silicon substrate(paragraph 0046).

Dean et al discloses the HF treatment of a silicon substrate prior to ALD (paragraph 0065).

It would have been obvious to one of ordinary skill in the art to have used HF as taught by Dean et al in the process taught by Haukka, et al because Haukka, et al teach an H-terminated silicon substrate, and the use of HF as taught by Dean et al would result in an H-terminated silicon substrate.

Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haukka, et al as applied to claim 1 above, and further in view of Derderian, et al (US 2003/0207593A1).

Haukka, et al is silent with respect to the recited compounds.

Derderian, et al teach that the precursor for titanium deposition can be  $\text{TiCl}_4$ (paragraph 0030,toward the middle of the first column of page 3). Derderian et al also includes niobium(paragraph 0041) in the embodiments, so that it is implied that a chloride of niobium could be used.

It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the compounds taught by Derderian et al in the process taught by Haukka, et al because both references teach ALD of oxides, and because metal chloride compounds are well known in the art to deposit metals.

With respect to the recited alkyl of Hf, this would have been within the ordinary skill in the art to have chosen, because Haukka, et al disclose that metal alkyls of

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aluminum may be used(paragraph 0064), so that one of ordinary skill in the art would have inferred that metal alkyls of the other metals can also be used.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caridad M. Everhart whose telephone number is 571-272-1892. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, B. Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C. Everhart  
4-7-2005

*C. Everhart*  
CARIDAD EVERHART  
PRIMARY EXAMINER